Patent Claims:

1. Brake system of the 'brake-by-wire' type for actuating a motor vehicle brake system comprising:
a brake booster which is operable in response to the driver's wish both by means of a brake pedal and by means of an electronic regulating and control unit,
with a means being provided to decouple a force-transmitting connection between the brake pedal and the brake booster in the 'brake-by-wire' operating mode,
a master brake cylinder connected downstream of the brake booster in terms of effect, to the pressure chambers of which wheel brakes of the motor vehicle are connected,
a pedal travel simulator which interacts with the brake pedal and due to which a resetting force acting on the brake pedal can be simulated in the 'brake-by-wire' operating mode independently of an actuation of the brake booster, and which can be enabled in the 'brake-by-wire' operating mode when the force-transmitting connection between the brake pedal and the brake booster is decoupled and can be disabled outside the 'brake-by-wire' operating mode,
a first sensor (6) to sense the brake pedal actuating travel (S_{Bp}), a second sensor (18) to sense the travel (S_{Ds}) of an output member (20) of the brake booster, and a third sensor (i.e. a pressure sensor (21)) to sense the brake pressure prevailing in the system, the signals of which sensors are sent to the electronic regulating and control unit (7),
c h a r a c t e r i z e d in that the electronic regulating and control unit (7) includes a control circuit

for controlling the travel (S_{Ds}) covered by the output member (20) of the brake booster (3), the nominal value ($S_{Dsnominal}$) of the travel (S_{Ds}) covered by the output member (20) of the brake booster (3) being calculated corresponding to the actuating travel (S_{Bp}) of the brake pedal (1), and a monitoring module (24) being provided which, in the case of a fault such as the inclusion of air or brake circuit failure, performs a partial compensation of the extension of the travel (S_{Ds}) covered by the output member (20) of the brake booster (3), which extension is caused by the fault.

2. Brake system of the 'brake-by-wire' type for actuating a motor vehicle brake system comprising:
a brake booster which is operable in response to the driver's wish both by means of a brake pedal and by means of an electronic regulating and control unit,
with a means being provided to decouple a force-transmitting connection between the brake pedal and the brake booster in the 'brake-by-wire' operating mode,
a master brake cylinder connected downstream of the brake booster in terms of effect, to the pressure chambers of which wheel brakes of the motor vehicle are connected,
a pedal travel simulator which interacts with the brake pedal and due to which a resetting force acting on the brake pedal can be simulated in the 'brake-by-wire' operating mode independently of an actuation of the brake booster, and which can be enabled in the 'brake-by-wire' operating mode when the force-transmitting connection between the brake pedal and the brake booster is decoupled

and can be disabled outside the 'brake-by-wire' operating mode,

a first sensor to sense the brake pedal actuating travel (S_{Bp}), a second sensor (18) to sense the travel (S_{Ds}) of an output member of the brake booster, and a third sensor (i.e. a pressure sensor (21)) to sense the brake pressure prevailing in the system, the signals of which sensors are sent to the electronic regulating and control unit (7),

c h a r a c t e r i z e d in that the electronic regulating and control unit (7) includes a control circuit for controlling the travel (S_{Ds}) covered by the output member (20) of the brake booster (3) and the hydraulic pressure (p) prevailing in the system, the nominal values ($S_{Dsnominal}$, $p_{nominal}$) thereof being calculated corresponding to the actuating travel (S_{Bp}) of the brake pedal (1), and a monitoring module (24) being provided which, in the case of a fault such as the inclusion of air or brake circuit failure, switches the control circuit from the travel control mode to the pressure control mode in order to perform a compensation of the extension of the travel (S_{Ds}) covered by the output member (20) of the brake booster (3), which extension is caused by the fault.

3. Brake system as claimed in claim 1 or 2,

c h a r a c t e r i z e d in that a pressure fluid volume/pressure characteristic curve is stored in the monitoring module (24), i.e. the dependency of the pressure fluid volume absorption (Q) of the brakes or of the travel (S_{Ds}) covered by the output member (20) of the brake booster (3) and corresponding to the pressure fluid volume absorption (Q) on the hydraulic pressure (p) Q or

$S_{Ds} = f(p)$, and in that the monitoring module (24) is furnished with the actual values ($S_{Dsactual}$, p_{actual}) of the travel (S_{Ds}) covered by the output member (20) of the brake booster (3) and of the hydraulic pressure (p) prevailing in the system, and a travel value (S_{model}) corresponding to the nominal value ($Q_{nominal}$) of the pressure fluid volume is calculated from the actual pressure value (p_{actual}) and compared with the actual value ($S_{Dsactual}$) of the travel (S_{Ds}) covered by the output member (20) of the brake booster (3), and a correction value (S_{corr}) is produced in the monitoring module (24) from which a fault in the system is inferred, when the comparison result ($\Delta S_{diff} = S_{model} - S_{Dsactual}$) exceeds a threshold value ($S_{threshold}$).

4. Brake system as claimed in claims 1 and 3, c h a r a c t e r i z e d in that the partial compensation of the extension of the travel (S_{Ds}) covered by the output member (20) of the brake booster (3), which extension is caused by the fault, is performed by adding a correction value (S_{corr}) to the nominal value ($S_{Dsnominal}$).

5. Brake system as claimed in claim 4, c h a r a c t e r i z e d in that the correction value (S_{corr}) corresponds to half the result of the comparison ($\Delta S/2$).

6. Brake system as claimed in claims 2 and 3, c h a r a c t e r i z e d in that the switch-over of the control circuit from the travel control mode to the

pressure control mode is performed by the correction value (S_{corr}).

7. Brake system as claimed in any one of the preceding claims,
c h a r a c t e r i z e d in that the actual values ($S_{Dsactual}$, p_{actual}) undergo a low-pass filtering operation.

8. Brake system as claimed in claims 2, 3, or 6,
c h a r a c t e r i z e d in that a transition function, e.g. low-pass filtering or a ramp function, is activated when a case of fault is detected.

9. Brake system as claimed in any one of claims 1 to 8,
c h a r a c t e r i z e d in that a warning lamp (31) is activated when a case of fault is detected in the system.